

CLAIMS

1. An air conditioner provided with a refrigerant circulation circuit including a variable capacity compressor, said air conditioner characterized by comprising collision force detecting means for detecting a collision force of a refrigerant flowing in said refrigerant circulation circuit to produce a collision force detection value, and discharge capacity control means for controlling a discharge capacity of said variable capacity compressor by referring to said collision force detection value.

2. An air conditioner according to claim 1, further comprising external information detecting means that can detect a change in refrigeration load as external information, wherein said discharge capacity control means determines a control target value about said collision force based on said external information, and executes a feedback control of said discharge capacity such that said collision force detection value approaches said control target value.

3. An air conditioner according to claim 1 or 2, wherein said collision force detecting means comprises a movable plate subjected to collision with the refrigerant, an elastic member elastically supporting said movable plate, and a displacement sensor for detecting a displacement of said movable plate.

4. An air conditioner according to claim 1 or 2, wherein said collision force detecting means comprises a deformable plate subjected to collision with the refrigerant, and a deformation sensor for detecting a deformation of said deformable plate.

5. An air conditioner according to claim 2, wherein said external information detecting means detects at least a low-pressure side pressure of said refrigerant circulation circuit as said external information, and said discharge capacity control means comprises target pressure determining means for determining a target pressure as said control target value based on said

external information, and discharge capacity control means for enabling switching of said feedback control so as to make a comparison between said low-pressure side pressure and said target pressure to cause said low-pressure side pressure to approach said target pressure.

6. An air conditioner according to any of claims 2 to 5, further comprising refrigerant shortage detecting means for detecting a shortage of the refrigerant in said refrigerant circulation circuit by the use of a speed signal of said variable capacity compressor, said collision force detection value, and said control target value.

7. An air conditioner according to claim 6, wherein said refrigerant shortage detecting means comprises means for deriving a difference between said control target value and said collision force detection value, and means for judging whether or not the refrigerant is insufficient, based on said difference and said speed signal.

8. An air conditioner according to claim 1 or 2, wherein said variable capacity compressor comprises a suction chamber, a discharge chamber, and a crank chamber, and said discharge capacity control means comprises a pressure relief passage connecting between said crank chamber and said suction chamber, a solenoid valve disposed in a passage serving to lead gas in said discharge chamber into said crank chamber, and means for driving said solenoid valve based on said collision force detection value to adjust a pressure in said crank chamber.

9. An air conditioner according to claim 1 or 2, wherein said variable capacity compressor comprises a suction chamber, a discharge chamber, and a crank chamber, and said discharge capacity control means comprises a pressure relief passage connecting between said discharge chamber and said crank chamber, a solenoid valve disposed in a passage serving to lead gas in said crank chamber into said suction chamber, and means for driving said

solenoid valve based on said collision force detection value to adjust a pressure in said crank chamber.

10. An air conditioner provided with a refrigerant circulation circuit including a variable capacity compressor, said air conditioner characterized by comprising a collision plate subjected to collision with a refrigerant flowing in said refrigerant circulation circuit, and a valve portion adapted to introduce discharged gas into a crank chamber, said valve portion provided to a rod through which an electromagnetic force is exerted to said collision plate, wherein when a force exerted to said collision plate by the collision with the refrigerant is greater than said electromagnetic force, said valve portion is opened to control a discharge capacity of said variable capacity compressor such that the force exerted to said collision plate approaches said electromagnetic force.

11. An air conditioner according to claim 10, wherein said valve portion is applied with a spring force so as to be opened when said electromagnetic force is shut off.

12. An air conditioner according to claim 10 or 11, wherein a gas pressure applied to said rod and a sectional area thereof are adjusted so that opening/closing of said valve portion is carried out only based on the collision force of the refrigerant exerted to said collision plate, said spring force, and said electromagnetic force.

13. An air conditioner according to any of claims 10 to 12, further comprising external information detecting means that can detect a change in refrigeration load as external information, wherein the electromagnetic force serving as a control target value is determined based on said external information, and the discharge capacity of said variable capacity compressor is feedback controlled such that the force exerted to said collision plate approaches said control target value.